

Information Summaries

KSC Historical Report No. 1B (KHR-1B)

Space Shuttle Launches

Kennedy Space Center
January 1981 - December 1999
Total Space Shuttle Launches - 96

Space Shuttles are launched from NASA facilities at the Kennedy Space Center (KSC) in Florida. Landings have occurred at KSC and Edwards Air Force Base (EAFB) in California, the two prime end-of-mission landing sites; and one at Space Harbor (SH), formerly known as Northrup Strip, White Sands, N.M. All liftoff and landing dates are determined using Eastern Standard and Eastern Daylight Times. For more detailed information on Space Shuttle missions and payloads, refer to Space Shuttle Mission Chronology 1981-1998, KSC Release No. 12-92, Revised February 1999. See PMS-031, Major NASA Launches, for information on missions and payloads using other launch vehicles.

Columbia — OV-102
Challenger — OV-099

Discovery — OV-103
Atlantis — OV-104

Endeavour — OV-105

Note: The numbers next to the orbiter names and crew names indicate how many launches each has flown, including that flight. No number indicates first shuttle mission for that crew member.

Space Shuttle Missions

Operational Test Flights and Operational Flights

Mission Name	Crew	Launch Date Landing Date	Orbiter	Primary Payload	Launch Pad Landing Runway
STS-1	Young, Crippen	4/12/81 4/14/81	Columbia ¹	—	39A 23 EAFB
STS-2	Engle, Truly	11/12/81 11/14/81	Columbia ²	OSTA-1	39A 23 EAFB
STS-3	Lousma, Fullerton	3/22/82 3/30/82	Columbia ³	OSS-1	39A 17 SH
STS-4	Mattingly, Hartsfield	6/27/82 7/4/82	Columbia ⁴	DoD	39A 22 EAFB

Operational Flights

Mission Name Runway	Crew	Launch Date Landing Date	Orbiter	Primary Payload	Launch Pad Landing
STS-5	Brand, Overmyer, Lenoir, J. Allen	11/11/82 11/16/82	Columbia ⁵	SBS-3/Anik C-3	39A 22 EAFB
STS-6	Weitz, Bobko, Musgrave, Peterson	4/4/83 4/9/83	Challenger ¹	TDRS-1	39A 22 EAFB
STS-7	Crippen ² , Hauck, Ride, Fabian, Thagard	6/18/83 6/24/83	Challenger ²	Anik C-2/ Palapa B-1	39A 15 EAFB
STS-8	Truly ² , Brandenstein, Bluford, Gardner, Thornton	8/30/83 9/5/83	Challenger ³	INSAT 1B	39A 22 EAFB
STS—9	Young ² , Shaw, Parker, Garriott, Merbold, Lichtenberg	11/28/83 12/8/83	Columbia ⁶	Spacelab 1	39A 17 EAFB
STS-41-B	Brand ² , Gibson, Stewart, McNair, McCandless	2/3/84 2/11/84	Challenger ⁴	^a Westar VI/ ^a Palapa B-2	39A 15 KSC
STS-41-C	Crippen ³ , Scobee, van Hoften, Nelson, Hart	4/6/84 4/13/84	Challenger ⁵	^c Long Duration Exposure Facility	39A 17 EAFB
STS 41-D	Hartsfield ² , Coats, Hawley, Resnik, Mullane, Walker	8/30/84 9/5/84	Discovery ¹	SBS-4/ Telstar 3-C/ SYNCOM IV-2	39A 17 EAFB

Operational Flights *(continued)*

STS-41-G	Crippen ⁴ , McBride, Sullivan, Ride ² , Leestma, Garneau, Scully-Power	10/5/84 10/13/84	Challenger ⁶	ERBS/OSTA-3	39A 33 KSC
STS 51-A	Hauck ² , Walker, J. Allen ² , Fisher, Gardner ²	11/8/84 11/16/84	Discovery ²	Anik D-2/ SYNCOM IV-1	39A 15 KSC
STS 51-C	Mattingly ² , Shriver, Buchli, Onizuka, Payton	1/24/85 1/27/85	Discovery ³	DoD	39A 15 KSC
STS 51-D	Bobko ² , Williams, Seddon, Griggs, Hoffman, Garn, Walker	4/12/85 4/19/85	Discovery ⁴	Anik C-1/ ^b SYNCOM IV-3	39A 33 KSC
STS 51-B	Overmyer ² , Gregory, Lind, Thagard ² , Thornton, van den Berg, Wang	4/29/85 5/6/85	Challenger ⁷	Spacelab 3	39A 17 EAFB
STS 51-G	Brandenstein ² , Creighton, Lucid, Nagel, Fabian ² , Baudry, Sultan Al-Saud	6/17/85 6/24/85	Discovery ⁵	Arabsat 1-B/ Telstar 3-D/ Morelos-A	39A 23 EAFB
STS 51-F	Fullerton ² , Bridges, Musgrave ² , England, Henize, Acton, Bartoe	7/29/85 8/6/85	Challenger ⁸	Spacelab 2	39A 23 EAFB
STS 51-I	Engle ² , Covey, van Hoften ² , Lounge, Fisher	8/27/85 9/3/85	Discovery ⁶	AUSSAT 1/ASC 1/ SYNCOM IV-4	39A 23 EAFB
STS 51-J	Bobko ³ , Grabe, Stewart ² , Hilmers, Pailles	10/3/85 10/7/85	Atlantis ¹	DoD	39A 23 EAFTB
STS-61-A	Hartsfield ³ , Nagel ² , Buchli ² , Bluford ² , Dunbar, Furrer, Ockels, Messerschmid	10/30/85 11/6/85	Challenger ⁹	Spacelab D-1	39A 17 EAFB
STS 61-B	Shaw ² , O'Connor, Cleave, Spring, Ross, Vela, Walker	11/26/85 12/3/85	Atlantis ²	Morelos-B/ AUSSAT-2/ RCA SATCOM Ku-2	39A 22 EAFB
STS 61-C	Gibson ² , Bolden, Chang-Diaz, Hawley ² , Nelson ² , Cenker, Nelson	1/12/86 1/18/86	Columbia ⁷	RCA SATCOM Ku-1	39A 22 EAFB
STS 51-L	Scobee ² , Smith, McNair, Resnik, Onizuka ² , Jarvis, McAuliffe	1/28/86	Challenger ¹⁰	TDRS-B	39B
STS-26	Hauck ³ , Covey ² , Lounge ² , Hilmers ² , Nelson ³	9/29/88 10/3/88	Discovery ⁷	TDRS-3	39B 17 EAFB
STS-27	Gibson ³ , Gardner ¹ , Shepherd, Mullane ² , Ross ²	12/2/88 12/6/88	Atlantis ³	DoD	39B 17 EAFB
STS-29	Coats ² , Blaha, Buchli ³ , Springer, Bagian	3/13/89 3/18/89	Discovery ⁸	TDRS-4	39B 22 EAFB
STS-30	Walker, ² Grabe ² , Thagard ³ , Cleave ² , Lee	5/4/89 5/8/89	Atlantis ⁴	Magellan	39B 22 EAFB
STS-28	Shaw ³ , Richards, Leestma ² , Adamson, Brown	8/8/89 8/13/89	Columbia ⁸	DoD	39B 17 EAFB
STS-34	Williams ² , McCulley, E. Baker, Chang-Diaz ² , Lucid ²	10/18/89 10/23/89	Atlantis ⁵	Galileo	39B 23 EAFB
STS-33	Gregory ² , Blaha ² , Musgrave ³ , Thornton ³ , Carter	11/22/89 11/27/89	Discovery ⁹	DoD	39B 4 EAFB
STS-32	Brandenstein ³ , Wetherbee, Dunbar ² , Ivins, Low	1/9/90 1/20/90	Columbia ⁹	SYNCOM IV-5/ ^q LDEF	39A 22 EAFB
STS-36	Creighton ² , Casper, Hilmers ³ , Mullane ³ , Thuot	2/28/90 3/4/90	Atlantis ⁶	DoD	39A 23 EAFB
STS-31	Shriver ² , Bolden ² , Hawley ³ , McCandless ² , Sullivan ²	4/24/90 4/29/90	Discovery ¹⁰	Hubble Space Telescope	39B 22 EAFB
STS-41	Richards ² , Cabana, Shepherd ² , Melnick, Akers	10/6/90 10/10/90	Discovery ¹¹	Ulysses	39B 22 EAFB
STS-38	Covey ³ , Culbertson, Meade, Springer ² , Gemar	11/15/90 11/20/90	Atlantis ⁷	DoD	39A 33 KSC
STS-35	Brand ³ , Gardner ² , Lounge ³ , Hoffman ² , Parker ² , Parise, Durrance	12/2/90 12/11/90	Columbia ¹⁰	Astro-1	39B 22 EAFB
STS-37	Nagel ³ , Cameron, Apt, Godwin, Ross ³	4/5/91 4/11/91	Atlantis ⁸	^f Gamma Ray Observatory	39B 33 EAFB
STS-39	Coats ³ , Hammond, Harbaugh, McMonagle, Bluford ² , Hieb, Veach	4/28/91 5/6/91	Discovery ¹²	DoD	39A 15 KSC

Operational Flights *(continued)*

STS-40	O'Connor ² , Gutierrez, Jernigan, Seddon ² , Bagian ² , Gaffney, Hughes-Fulford	6/5/91 6/14/91	Columbia ¹¹	Spacelab Life Sciences-1	39B 22 EAFB
STS-43	Blaha ³ , M. Baker, Adamson ² , Low ² , Lucid ³	8/2/91 8/11/91	Atlantis ⁹	TDRS-5	39A 15 KSC
STS-48	Creighton ³ , Reightler, Buchli, Brown, Gemar ²	9/12/91 9/18/91	Discovery ¹³	Upper Atmosphere Research Satellite	39A 22 EAFB
STS-44	Gregory ³ , Henricks, Musgrave ⁴ , Runco, J. S. Voss, Hennen	11/24/91 12/1/91	Atlantis ¹⁰	Defense Support Program Satellite	39A 5 EAFB
STS-42	Grabe ³ , Oswald, Readdy, Thagard ⁴ , Hilmers ⁴ , Bondar, Merbold	1/22/92 1/30/92	Discovery ¹⁴	IML-1	39A 22 EAFB
STS-45	Bolden ³ , Duffy, Sullivan ³ , Leestma ³ , Foale, Frimout, Lichtenberg ²	3/24/92 4/2/92	Atlantis ¹¹	ATLAS-1	39A 33 KSC
STS-49	Brandenstein ⁴ , Chilton, Melnick ² , Akers ² , Thornton ² , Hieb ² , Thuot ²	5/7/92 5/16/92	Endeavour ¹	⁹ INTELSAT rescue and deployment	39B 22 EAFB
STS-50	Richards ³ , Bowersox, Dunbar ³ , Meade ² , Baker ² , Trinh, DeLucas	6/25/92 7/9/92	Columbia ¹²	USML-1	39A 33 KSC
STS-46	Shriver ³ , A. Allen, Hoffman ³ , Ivins ² , Chang-Diaz ³ , Nicollier, Malerba	7/31/92 8/8/92	Atlantis ¹²	TSS-1/ ⁱ EURECA	39B 33 KSC
STS-47	Gibson ⁴ , Brown, Lee ² , Davis, Apt ² , Jemison, Mohri	9/12/92 9/20/92	Endeavour ²	Spacelab-J	39B 33 KSC
STS-52	Wetherbee ² , M. Baker ² , Shepherd ³ , Jernigan ² , Veach ² , MacLean	10/22/92 11/1/92	Columbia ¹³	^h Lageos II/ USMP-1	39B 33 KSC
STS-53	Walker ³ , Cabana ² , Bluford ⁴ , J. S.Voss ² , Clifford	12/2/92 12/9/92	Discovery ¹⁵	DoD	39B 22 EAFB
STS-54	Casper ² , McMonagle ² , Runco Jr. ² , Harbaugh ² , Helms	1/13/93 1/19/93	Endeavour ³	TDRS-6	39B 33 KSC
STS-56	Cameron ² , Oswald ² , Cockrell, Foale ² , Ochoa	4/8/93 4/17/93	Discovery ¹⁶	ATLAS-2	39B 33 KSC
STS-55	Nagel ⁴ , Henricks ² , Ross ⁴ , Precourt, Harris Jr., Walter, Schlegel	4/26/93 5/6/93	Columbia ¹⁴	Spacelab D-2	39A 22 EAFB
STS-57	Grabe ⁴ , Duffy ² Low ³ , Sherlock, J. E. Voss, Wisoff	6/21/93 7/1/93	Endeavour ⁴	SPACEHAB-1/ ⁱ EURECA retrieval	39B 33 KSC
STS-51	Culbertson Jr. ² , Readdy ² , Newman, Bursch, Walz	9/12/93 9/22/93	Discovery ¹⁷	ACTS-TOS ORFEUS-SPAS	39B 15 KSC
STS-58	Blaha ⁴ , Searfoss, Seddon ³ , McArthur Jr., Wolf, Lucid ⁴ , Fettman	10/18/93 11/1/93	Columbia ¹⁵	Spacelab Life Sciences-2	39B 22 EAFB
STS-61	Covey ⁴ , Bowersox ² , Musgrave ⁵ , Hoffman ⁴ , Thornton ³ , Akers ³ , Nicollier ²	12/1/93 12/13/93	Endeavour ⁵	Hubble Space Telescope (HST) Servicing	39B 33 KSC
STS-60	Bolden ⁴ , Reightler ² , Chang-Diaz ⁴ , Davis ² , Sega, Krikalev (Russian cosmonaut)	2/3/94 2/11/94	Discovery ¹⁸	SPACEHAB-2 Wake Shield Facility-1	39A 15 KSC
STS-62	Casper ³ , A. Allen ² , Gemar ³ , Ivins ³ , Thuot ³	3/4/94 3/18/94	Columbia ¹⁶	USMP-2/ OAST-2	39B 33 KSC
STS-59	Gutierrez ² , Chilton ² , Godwin ² , Apt ³ , Clifford ² , Jones	4/9/94 4/20/94	Endeavour ⁶	Space Radar Laboratory-1 (SRL-1)	39A 22 EAFB
STS-65	Cabana ³ , Halsell, Hieb ³ , Thomas, Walz ² , Chiao, Naito-Mukai	7/8/94 7/23/94	Columbia ¹⁷	IML-2	39A 33 KSC

LEGEND:

- a - Entered unplanned orbit; recovered on STS 51-A and returned to Earth on November 16, 1984.
- b - Failed to activate after deployment; was successfully repaired during STS 51-I and later entered normal service.
- c - The Long Duration Exposure Facility (LDEF) was deployed on STS 41-C onApril 7, 1984, and retrieved from space during STS-32 on January 12, 1990. It was returned to KSC on 1/26/90, where the experiment trays were removed.
- d - NASA's Space Shuttle liftoff, routine space operations and orbiter landing were successful. The Department of Defense (DoD) does not discuss the success of its payloads or experiments on classified missions.
- e - Most or all payloads on these DoD missions are unclassified.
- f - When deployed on April 7, 1991, the 35,000-pound spacecraft was called the Gammy Ray Observatory (GRO). NASAannounced on September 23, 1991, that it was renaming the satellite theArthur Holly Compton Gamma Ray Observatory or Compton Observatory in honor of the late Nobel Prize-winning physicist.
- g - INTELSAT VI (F3) was launched into space aboard a Titan launch vehicle in March 1990. The Titan's second stage failed to separate from the satellite's perigee kick motor; without the extra boost from the kick motor, the INTELSAT satellite remained in an unusable low orbit. The STS-49 crew retrieved the satellite in the final of three space walks, and redeployed it with a new kick motor
- h - LAGEOS 1 was launched in 1976 on a Delta expendable vehicle.
- i - The European Retrievable Carrier, or EURECA, was deployed on August 2, 1992, during STS-46. The free-flying platform with 15 scientific instruments was retrieved during Mission STS-57, on June 24, 1993.

Operational Flights (continued)

Mission Name	Crew	Launch Date Landing Date	Orbiter	Primary Payload	Launch Pad Landing Runway
STS-64	Richards ⁴ , Hammond ² , Helms ² , Meade ³ , Lee ³ , Linenger	9/9/94 9/20/94	Discovery ¹⁹	Lidar In-Space Technology Experiment (LITE)	39B 04 EAFB
STS-68	M. Baker ³ , Wilcutt, Jones ² , Bursch ² , Wisoff ² , Smith	9/30/94 10/11/94	Endeavour ⁷	SRL-2	39A 22 EAFB
STS-66	McMonagle ³ , Brown ² , Ochoa ² , Tanner, Parazynski, Clervoy	11/3/94 11/14/94	Atlantis ¹³	ATLAS-3/ CRISTA-SPAS	39B 22 EAFB
STS-63	Wetherbee ³ , Collins, Foale ³ , J.E. Voss ² , Harris Jr. ² , Titov ⁴	2/3/95 2/11/95	Discovery ²⁰	SPACEHAB-3/ MIR Spartan-204	39B 15 KSC
STS-67	Oswald ³ , Gregory, Jernigan ³ , Grunsfeld, Lawrence, Parise ² , Durrance ²	3/2/95 3/18/95	Endeavour ⁸	Astro-2	32A 22EAFB
STS-71	Gibson ⁵ , Precourt ² , E. Baker ³ , Dunbar ⁴ , Harbaugh ³ , Solovveyev ⁴ , Budarin, Return from MIR: Dezhurov, Strekalov ⁶ , Thagard; Solovveyev ⁴ , Budarin stay on MIR	6/27/95 7/7/95	Atlantis ¹⁴	1st MIR docking/ crew transfer	39A 15 KSC
STS-70	Henricks ³ , Kregel, Currie ² , Thomas ² , Weber	7/13/95 7/22/95	Discovery ²¹	TDRS-7	39B 33 KSC
STS-69	Walker ⁴ , Cockrell ² , J.S. Voss ³ , Newman ² , Gernhardt	9/7/95 9/18/95	Endeavour ⁹	Spartan 201-03/ Wake Shield Facility-2	39A 33 KSC
STS-73	Bowersox ³ , Rominger, Thornton ⁴ , Coleman, Lopez-Alegria, Leslie, Sacco Jr.	10/20/95 11/5/95	Columbia ¹⁸	USML-2	39B 33 KSC
STS-74	Cameron ³ , Halsell Jr. ² , Ross ⁵ , McArthur Jr. ² , Hadfield	11/12/95 11/20/95	Atlantis ¹⁵	MIR docking-2	39A 33 KSC
STS-72	Duffy ³ , Jett, Chiao ² , Barry, Scott, Wakata	1/11/96 1/20/96	Endeavour ¹⁰	SFU retrieval/ OAST Flyer	39B 15 KSC
STS-75	A. Allen ³ , Horowitz, Chang-Diaz ⁵ , Cheli, Hoffman ⁵ , Nicollier ³ , Guidoni	2/22/96 3/9/96	Columbia ¹⁹	TSS-1R/ USMP-03	39B 33 KSC
STS-76	Chilton ³ , Searfoss ² , Lucid ⁵ , Godwin ³ , Clifford ³ , Sega ² Lucid stays on Mir	3/22/96 3/31/96	Atlantis ¹⁶	SPACEHAB-SM/ MIR docking-3/ crew transfer	39B 22EAFB
STS-77	Casper ⁴ , Brown Jr. ³ , Bursch ³ , Runco Jr. ³ , Garneau ² , Thomas	5/19/96 5/29/96	Endeavour ¹¹	SPACEHAB-4/ Spartan-207/IAE	39B 33 KSC
STS-78	Henricks ⁴ , Kregel ² , Helms ³ , Linnehan, Brady Jr., Favier, Thirsk	6/20/96 7/7/96	Columbia ²⁰	SPACELAB-LMS	39B 33 KSC
STS-79	Readdy ³ , Wilcutt ² , Akers ⁴ , Blaha ⁵ , Apt ⁴ , Walz ³ Return from MIR: Lucid; Blaha replaces her	9/16/96 9/26/96	Atlantis ¹⁷	SPACEHAB/ MIR docking-4/ crew transfer	39A 15 KSC
STS-80	Cockrell ³ , Rominger ² , Jernigan ⁴ , Jones ³ , Musgrave ⁶	11/19/96 12/7/96	Columbia ²¹	ORFEUS-SPAS II	39B 33 KSC
STS-81	M. Baker ⁴ , Jett ² , Grunsfeld ² , Ivins ⁴ , Wisoff ³ , Linenger ² Return from MIR: Blaha; Linenger replaces him	1/12/97 1/22/97	Atlantis ¹⁸	SPACEHAB-DM MIR docking-5/ crew transfer	39B 33 KSC
STS-82	Bowersox ⁴ , Horowitz ² , Lee ⁴ , Hawley ⁴ , Harbaugh ⁴ , Smith ² , Tanner ²	2/11/97 2/21/97	Discovery ²²	Hubble Servicing Mission 2	39A 33 KSC
STS-83	Halsell Jr. ³ , Still, J.E. Voss ³ , Thomas ³ , Gernhardt ² , Crouch, Linteris	4/4/97 4/8/97	Columbia ²²	MSL/ SAREX	39A 15 KSC
STS-84	Precourt ³ , Collins ² , Foale ⁴ , Noriega, Lu, Clervoy ² , Kondakova ² Return from MIR: Linenger; Foale replaces him	5/15/97 5/24/97	Atlantis ¹⁹	SPACEHAB-DM MIR docking-6/ crew transfer	39A 33 KSC
STS-94	Halsell Jr. ⁴ , Still ² , J.E. Voss ⁴ , Thomas ⁴ , Gernhardt ³ , Crouch ² , Linteris ²	7/1/97 7/17/97	Columbia ²³	MSL/ SAREX	39A 33 KSC
STS-85	Brown Jr. ⁴ , Rominger ³ , Davis ³ , Curbeam Jr., Robinson , Tryggvason	8/7/97 8/19/97	Discovery ²³	CRISTA-SPAS (DARA)	39A 33 KSC
STS-86	Wetherbee ⁴ , Bloomfield, Titov ⁵ , Parazynski ² , Chretien ³ , Lawrence ² , Wolf ² Return from MIR: Foale; Wolf replaces him	9/25/97 10/6/97	Atlantis ²⁰	SPACEHAB-DM MIR docking-7/ crew transfer	39A 15 KSC
STS-87	Kregel ³ , Lindsey, Scott ² , Chawla, Doi, Kadenyuk	11/19/97 12/5/97	Columbia ²⁴	USMP-4/ Spartan-201-04	39B 33 KSC
STS-89	Wilcutt ³ , Edwards Jr., Dunbar ⁵ , Anderson, Reilly II, Sharipov, Thomas ² Return from MIR: Wolf; Thomas replaces him	1/22/98 1/31/98	Endeavour ¹²	SPACEHAB-DM MIR-docking-8/ crew transfer	39A 15 KSC
STS-90	Searfoss ³ , Altman, Linnehan ² , Williams, Hire, Buckey, Pawelczyk	4/17/98 5/3/98	Columbia ²⁵	Neurolab/ GAS	39B 33KSC

Operational Flights (continued)

STS-91	Precourt ⁴ , Gorie, Lawrence ³ , Chang-Diaz ⁶ , Kavandi, Ryumin ⁴ Return from MIR: Thomas	6/2/98 6/12/98	Discovery ²⁴	SPACEHAB-SM/ GAS /AMS MIR docking-9/ crew transfer	39A KSC
STS-95	Brown ⁵ , Lindsey ² , Parazynski ³ , Robinson ² , Duque, Mukai ² , Glenn	10/29/98 11/7/98	Discovery ²⁵	SPACEHAB-SM/ Spartan-201/ HOST/IEH-03	39B 33 KSC
STS-88	Cabana ⁴ , Sturckow, Currie ³ , Ross ⁶ , Newman ³ , Krikalev ²	12/4/98 12/15/98	Endeavour ¹³	Space Station Assembly flight 2A/ Unity/Hitchhiker/ MightySat-1/SAC-A	39A 15 KSC
STS-96	Kent Rominger ⁴ , Rick Husband, Ellen Ochoa ³ , Tamara Jernigan ⁵ , Daniel Barry ² , Julie Payette, Valery Tokarev	5/27/99 6/6/99	Discovery ²⁶	2nd flight to Space Station, carrying OTD, STRELA, STARSHINE	39B 15 KSC
STS-93	Eileen Collins ³ , Jeffrey Ashby, Steven Hawley ⁵ , Cady Coleman ² , Michel Tognini ²	7/23/99 7/27/99	Columbia ²⁶	Chandra X-ray Observatory	39B 33 KSC
STS-103	Curtis Brown Jr. ⁵ , Scott Kelly, Steven Smith ³ , Michael Foale ⁵ , John Grunsfeld ³ , Claude Nicollier ⁴ , Jean-Francois Clervoy ³	12/19/99 12/27/99	Discovery ²⁷	Rate Sensor Units, computer, solid state digital recorder, for repair/maintenance of Hubble Space Telescope	39B 33 KSC



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- g - INTELSAT VI (F3) was launched into space aboard a Titan launch vehicle in March 1990. The Titan's second stage failed to separate from the satellite's perigee kick motor; without the extra boost from the kick motor, the INTELSAT satellite remained in an unusable low orbit. The STS-49 crew retrieved the satellite in the final of three space walks, and redeployed it with a new kick motor
- h - LAGEOS 1 was launched in 1976 on a Delta expendable vehicle.
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